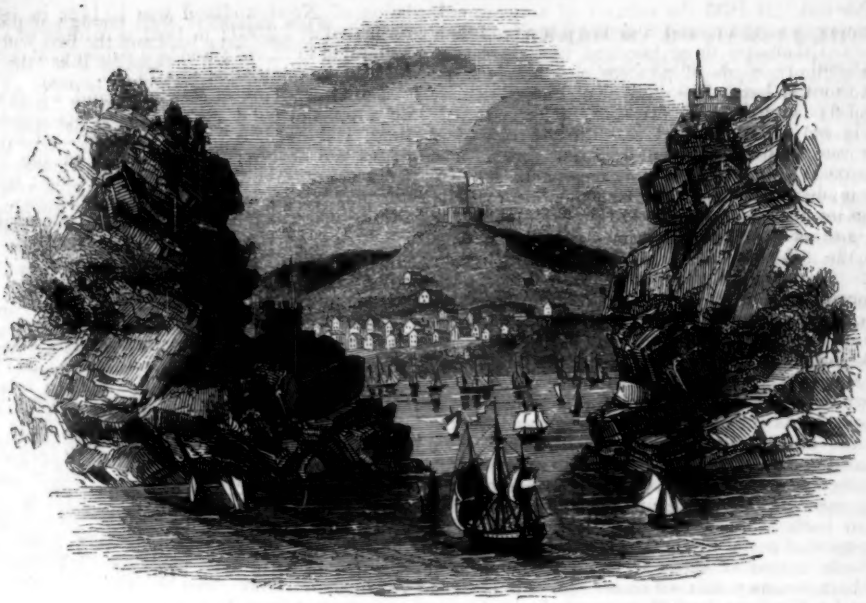

[Town and Harbour of St. John s.]

## NEWFOUNDLAND.

The island of Newfoundland, lying nearly opposite the Gulf of St. Lawrence, is the nearest to Great Britain of any of our North American possessions; the distance between St. John's and the harbour of Valencia in Ireland being only one thousand six hundred and fifty-six sea-miles. It was discovered by the Norwegians before the tenth century, but its existence seems to have been forgotten until its rediscovery in 1497 by John Cabot, then in the service of Henry VII. His report of the great quantities of fish on the coasts induced private adventurers to resort there so early as the year 1500, and in 1536 a merchant of London attempted, with the crew of his ship, to pass the winter on the island; but the hardships they endured compelled them to return to England before the winter was over. In 1853 Sir Humfrey Gilbert, half-brother to Sir Walter Raleigh, having obtained a grant of two hundred leagues round any point of the coast where he might choose to settle, proceeded to Newfoundland with two hundred people in five small ships, and formed a settlement in the Bay of St. John. Dissensions soon broke out amongst the settlers: some returned to England; and of the remainder, above one hundred were lost in one of the ships in a storm while exploring the south part of the island. Several other attempts to form a settlement also failed. In 1623 Sir George Carteret, afterwards Lord Baltimore, formed a colony in the south-eastern part of the island, which he called Avalon. He appointed his son governor, and soon afterwards proceeded to the settlement himself, in order that he might enjoy the free exercise of the Roman Catholic religion. Ten years afterwards Lord Falkland, then lord-lieutenant of Ireland, sent a body of settlers from that part of the kingdom; and in 1654 Sir David Kirk, having procured a grant of land from the Parliament, went with a few settlers to take possession. The French had in the meantime been active in establishing a settlement on the island. The French fishermen paid five per cent. on the value of the fish which they took, as an acknowledgment of the sovereignty of the British. In 1675 Charles II. relinquished this tribute, and the French fishery rapidly increased. The French and English fishermen were, however, constantly in collision; and the encroachments of the French were alluded to in the declaration of war against France, issued by William III. shortly after he came to the throne, and were indeed set forth as one of the causes of the war. After alluding to the tribute which the French formerly paid as an acknowledgment of the sole right of the crown of England, the declaration stated, that "of late the encroachments of the French upon that island, and his majesty's subjects' trade and fishery there, had been more like the invasion of an enemy than becoming friends who enjoyed the advantages of that trade only by permission." During this and the following war both the French and English settlements were frequently attacked. In 1708 the town of St. John's was nearly destroyed by the French, and they had gained possession of nearly every settlement; but at the peace of Utrecht, in 1714, the sovereignty of the English was duly acknowledged: the French were permitted to occupy the small islands of St. Pierre and Miquelon, near the entrance of Placentia Bay, the garrison in each not being allowed to exceed fifty men. The French were to enjoy the rights of fishery under certain restrictions; but this subject is still in a disputed and unsatisfactory state.

Newfoundland is rather larger than England and Wales. Little is known of the interior. The shores are indented by broad and deep bays entering from forty to fifty miles into the body of the island. The western coast is generally rugged and lofty, but the eastern side of the island consists principally of low hills. The climate is humid, and especially disagreeable on the setting in and breaking up of winter, and when the fields of ice, which float from north to south during the months of April and May, are near the coast, and the wind is from seaward. The heat in summer is often very great. There are tracts of alluvial soil along the banks of the rivers, but from the nature of the climate agriculture will always be a secondary branch of industry, as the fisheries on the coast are a more profitable pursuit than the cultivation of an in-

hospitable soil. In 1836 the number of acres in cultivation was eleven thousand and sixty-two, and their produce ten thousand three hundred bushels of oats, above a million bushels of potatoes, and nearly seven thousand tons of hay. The number of horses was one thousand five hundred and fifty-one, of horned cattle five thousand eight hundred and thirty-five, and of sheep three thousand one hundred and three. The inhabitants are for the most part dependent for provisions upon importation. In fact, if it were not for the fisheries, the island would not probably be settled at all; and as it is, large numbers only resort to it during the fishing-season, and leave it during the winter. The settlements are all upon the coast, the grand occupation of the population being exclusively in the fisheries, and in those branches of industry which are immediately connected therewith. The peninsula of Avalon, which is united to the main body of the island by a low isthmus little more than three miles wide, is the chief seat of the population, the settlements on the other coasts being few and far between, and of little individual importance. In these latter settlements, from their little intercourse with one another, the character of each is singularly diversified, preserving traits of their origin as distinct as if they had been formed yesterday. Archdeacon Wix, who, in spite of perils by sea and land of no common kind, made a tour of these secluded settlements in 1835, which he has published under the title of 'Six Months of a Newfoundland Missionary's Journal,' says that "a single league may often carry the traveller upon the same shore from a people whose habits are extremely coarse and revolting, to a population which has suffered nothing, perhaps has gained, from its being far removed from the seat of advanced civilization and refinement. Much of the character of a settlement must of course depend for several generations on the character of its original settlers." The original settlers were either from Jersey, England, Scotland, Ireland, or France. The want of education and of the means of religious instruction is deplorable in most of these scattered settlements, and in some the inhabitants are verging to a state of ignorance and brutality which will render the people little better than savages. Archdeacon Wix found in some of the most secluded settlements that a rude calendar was attempted to be kept, but that from neglect or mistakes the Sunday was in some cases kept by a few religious families on a Saturday or Monday, a day having been lost or gained.

The following description of St. John's, the capital of the island, is taken from the 'Penny Cyclopædia:'—"The port and town of St. John's is on the east side of the island. The entrance of the harbour is so narrow that two ships can hardly pass abreast with safety. There are twelve feet water in the middle of the channel. The harbour is spacious and sheltered on all sides by high rocks; its fortifications are rather strong than extensive. The town runs along nearly the whole of the north side of the port, but there can scarcely be said to be more than one street, the others being irregular lanes. A few of the houses are of stone or brick, and some of them are handsome, but the greater part are of wood. The government and public offices are tolerably extensive. The population in summer hardly exceeds ten thousand, but on the return of the fishermen it is increased to fifteen thousand." There are two episcopal churches, and the Roman Catholics, who are numerous, have one of the finest chapels in British North America. Harbour Grace, on the western shore of Conception Bay, is the next town in importance, and contains a population of five thousand. The other settlements are small, and consist chiefly of wooden houses. In 1763 the population of Newfoundland was 13,112; in 1806 it was estimated at 26,500; in 1823, according to a census, it amounted to 52,157; and by a subsequent census taken in 1836 the population was 73,705.

The Great Bank of Newfoundland, which appears to be a mass of solid rock, is about six hundred miles long, and in some places two hundred broad. The edges are abrupt; the soundings on the bank vary from twenty-five to ninety-five fathoms; but there is one part which is only about four fathoms. The best fishing-grounds are between 42° and 46° north latitude, south-east of the island. The temperature of the water is from 10° to 12° colder than that of the surrounding sea. In 1793 the fishery employed 400 ships, of the aggregate burthen of 38,000 tons, and 2000 boats. In 1836, 800 ships arrived in the colony, and their total burthen was 98,830 tons; more than one-half were from Great Britain and her colonies; 30 ships were from the United States; and 252 from other foreign states. The fishery in 1836 produced 860,354 quintals of codfish, 1534 barrels of herrings, 1847 tierces of salmon, 384,321 seal-skins, and 9485 tuns of cod, seal, and whale oil; the value of the whole being 808,066*l*. The importations consist of salt provisions from Ireland and Germany; biscuit from Germany; flour from the United States and the north of Europe; and Indian corn meal from the United States. The total value of the imports in 1836 was 579,799*l*., and of the exports 787,099*l*.

## PERFORATIONS IN SHAKSPERE'S CLIFF, DOVER.

RAILWAY engineering is producing remarkable changes in the appearance of many spots hitherto held almost sacred by the antiquary or the poet. The 'viaduct' and the 'tunnel,' the 'embankment' and the 'cutting,' are changing the face of many such scenes in different parts of England: we may occasionally regret that such should be the case; yet so long as land is readily sold when a price is offered for it, the natural course of commercial enterprise will lead to such results. One instance of this sort is afforded in the works now in progress for the South-Eastern Railway, the remarkable elevation westward of Dover, known as 'Shakspere's Cliff,' has been perforated with no fewer than sixteen channels or passages.

In our account of Dover Castle given in a former volume,* the Shakspere Cliff was mentioned in a short paragraph; but the nine years which have elapsed since that article was written have witnessed singular changes in its state, and of these changes we shall present a few details furnished by a recent visit to the spot.

To understand the route of the South-Eastern Railway, through and among the cliffs westward of Dover, it will be necessary to bear in mind the general character of the coast. From the South Foreland to Folkstone, a distance in a straight line of probably ten miles, the Kentish coast presents a succession of high cliffs so little broken that there is only one spot in the intervening distance where a town could be built on the sea-shore: this is the spot occupied by Dover. At Dover the cliffs recede from the sea, insomuch that, instead of being washed by the waves, they are situated so far inland as to allow a part of the town to be built on the shore between them and the sea. There is also a complete break or valley in the cliffs at this part, by which the road to Dover from Canterbury enters the town; and along this depressed portion the remainder of the town is built. Dover thus lies in a hollow, on the eastern side of which is a bold cliff surmounted by the castle: from this latter a complete view of the

* 'Penny Magazine,' vol. ii., p. 57.

whole town can be obtained. Westward of the depression, which we have called the valley, the hilly ground recommences, at some distance from the sea, and forms the fortified Western Heights, to which access is gained from the town of Dover by a spiral staircase of two hundred steps, called the Military Shaft. From these heights the hilly ground approaches nearer and nearer to the sea, till at length it again forms chalky cliffs washed by the sea. Shakspere's Cliff is one of the many prominent elevations presented in the distance from thence to Folkstone.

When, eight or ten years ago, a project was set on foot for forming a railroad from London to the eastern part of Kent, many competing lines were proposed; one through the northern part of the county, one through the midland district, and one approaching more nearly to the Sussex coast. But none of these could reach Dover without perforations of some kind through the cliffs by which the town is bounded on the land side. Into the history of the parliamentary discussion carried on by the advocates of the competing lines we shall not enter, suffice it to say that about five or six years ago the South-Eastern Railway was determined on: proceeding from London on part of the London and Brighton line, thence eastward through a flat district known as the Weald of Kent, and lastly through and among and around the cliffs separating Folkstone from Dover. Heavy works were resolved upon in these cliffs, in order to bring the terminus of the railway as close as possible to Dover Harbour; and thus it happened that Shakspere's Cliff became one of those included in the operations.

All the perforations intended to be made through the cliff are, we believe, now nearly completed, and we can therefore judge of their general effect. A portion of the railway, a few miles beyond Folkstone, will pass through a cliff near the sea by a tunnel upwards of a mile in length; it will then emerge, and pass for a mile and a quarter quite close to the sea, having stupendous cliffs bounding it on one hand, and the sea beneath it on the other; a situation the most striking and beautiful perhaps that any of our railways present. The railroad will then pass through the Shakspere Cliff by a double tunnel, three-quarters of a mile in length, and, on its emergence, will be continued on an embankment or artificial beach at the sea-side, to a point very near Dover Harbour.

By a double tunnel through Shakspere's Cliff, we mean a tunnel arranged on the principle of the Thames Tunnel, one archway being devoted to carriages proceeding from east to west, and the other for those passing from west to east. These parallel arches or tunnels are neither circular nor elliptical, as usually constructed, but pointed Gothic, each arch being thirty feet high by twelve wide. At certain intervals there are lateral communications from one archway to the other. From the level of the tunnels to the summit of the cliff seven vertical shafts ascend, about six feet in diameter, and varying from about a hundred and sixty to two hundred feet high; each arch descending to one of the lateral communications from tunnel to tunnel. From the tunnels, and at right angles to their length, are seven horizontal shafts or galleries carried out to the very face of the cliff: they are about six feet wide and seven high, and descend by a slight inclination to the face of the cliff, the distance being probably from four to six hundred feet. We are not aware that any other railroad tunnels present this singular feature of horizontal galleries at right angles to their length; nor, indeed, are there many districts where such could be procured. The object of these lateral galleries is twofold. In the first place they have furnished a convenient means whereby the chalk and rock excavated from the tunnels could be precipitated into the sea; and in the next place they will aid in producing a more complete ventilation of the tunnels than vertical shafts alone could afford; for in summer the air within all these tunnels, being colder and heavier than that without, can scarcely ascend vertical shafts, whereas it can easily pass along these horizontal galleries to the sea. In making these various perforations the seven vertical shafts were sunk first, then the seven horizontal galleries proceeding thence to the sea-face of the cliff, and lastly the two tunnels themselves, parallel to each other and to the sea, and at an average distance from the sea of about four or five hundred feet.

A few hours spent at Dover would enable a stranger to witness much here described. To reach that end of the tunnel nearest to Dover, the face of the cliffs a little eastward of the entrance may be descended by steps cut in the chalky precipice; but a less difficult and dangerous path may be obtained along the beach from the streets of Dover near the fort. On the beach from the fort to the tunnel, a platform or embankment is now being formed to constitute part of the railroad, and at the end of this the light and elegant Gothic arches of the tunnel are seen. In order to obtain a favourable entrance to the tunnel, an immense semicircular mass of chalk rock has been cut away from the eastern end of Shakspere's Cliff; but beyond this, the admirers of the poet have not to complain of much change in the external appearance of the cliff, however much it may be honeycombed within. On reaching the entrance of the tunnel, a small house is seen, inhabited by an overseer or superintendant; and from him, owing to the liberal regulations of the Company, permission may be obtained to traverse the tunnel from end to end. No fees are allowed to be given to the servants of the Company; but any contribution which a visitor may be willing to make to a fund for the sick or injured workmen is received for that purpose. A lantern is given to the visitor, and with that in hand he may penetrate as far through the tunnel as his courage will permit. A slight glimmering of daylight is visible at the other end, but not sufficient to dispel the darkness, which is only rendered "more visible" by the lantern. The arches are not yet in a finished state, and the dropping of water from the roof renders the floor in many parts dirty and unpleasant. When we have groped our way along the tunnel (of which the northern archway only is at present open to visitors, the southern being occupied by workmen) to the first shaft, we find a lateral opening leading from one archway to the other; and in the middle of the pier or bulk which separates the arches we see, on looking up, the vertical shaft, extending upwards to a height nearly equal to that of the Monument of London. At right angles to the length of the tunnel daylight is seen through the horizontal gallery extending to the face of the cliff. Seven times does this recurrence of the vertical and lateral cuttings break the gloom and uniformity of the tunnel; and if this gloom is not sufficient to damp the curiosity of the visitor, he may proceed to the other end of the tunnel, where he may see the extensive preparations for continuing the railroad along the base of the cliffs close to the sea-shore.

From the perforations themselves we may transfer our attention to the appearance of the upper part of the cliff. Returning the lantern to the overseer at the entrance, and climbing up the face of the cliffs eastward of it, we get to the greensward above, and then gradually ascend Shakspere's Cliff by a pleasant path. Along the line of the tunnel are to be seen the upper ends of the seven shafts, all in a direct line, and projecting about eight or ten feet above the surface of the ground. From the line of these shafts a short ascent towards the south brings us to the very edge of the cliff, where,

although we cannot now see the "samphire" gatherer hanging in mid air, we may yet obtain a grand and beautiful prospect. A walk of about three-quarters of a mile along the edge of the cliff terminates at a hollow which separates Shakspere's Cliff from another cliff westward of it, and where, by descending a somewhat dangerous series of stairs or steps cut in the face of the chalk rock, we may reach the western end of the tunnel. Beyond this point the sea-wall and roadway along the base of the cliffs involve works of great magnitude, and will not be finished for many months. Still farther westward may be seen the entrance of another tunnel, longer than the former, and not yet in a forward state.

## THE TALEGALLA.

[Abridged from the 'Penny Cyclopædia.']

Talegalla Lathami. (Gould.)

THE Talegalla are a species of Australian birds of the genus *Megapodiinæ*, of which little has been correctly known till within a recent period. They had been considered as related to the family of vultures. Indeed Swainson has said:—"In fact, the feet of the two birds are formed nearly on the same principle; but, then, so are those of *Orthonyx*, a little scansorial bird not much bigger than a robin. All three genera (of the *Megapodiinæ*), in short, are remarkable for their large disproportionable feet, long and slightly curved claws, and the equality of length, or nearly so, of the outer and the middle toe. It is by instances such as these that we perceive the full extent of those unnatural combinations which result from founding our notions of classifications from one set of characters, and forgetting to look at the full consequences of carry those notions into extended operation. Nor is this the only peculiarity of the New Holland vulture; for, unlike all others of its family, it possesses eighteen feathers in its tail. An examination of the bill," Mr. Swainson gives a cut of it, "which is decidedly raptorial, joined with many other considerations, shows that all these are but analogical relations to the *Rasores*, while the real affinities of the bird are in the circle of the *Vulturidæ*, of which it forms the rasorial type."

Mr. Gould, to whom we are indebted for a full and satisfactory account of the habits of this extraordinary bird, to which we shall presently advert, modestly says:—"After all the facts that have been stated, I trust it will be evident that its natural situation is among the *Rasores*, and that it forms one of a great family of birds peculiar to Australia and the Indian Islands, of which *Megapodius* forms a part; and in confirmation of this view I may add, that the sternum has the two deep emarginations so truly characteristic of the *Gallinaceæ*; at all events it is in no way allied to the *Vulturidæ*, and is nearly as far removed from *Menura*." It seems to us that *Talegalla Lathami* may be considered, in a degree, as the representative of the turkey in Australia.

The adult male has the whole of the upper surface, wings, and tail, of a blackish-brown; the feathers of the under surface blackish-brown at the base, becoming silvery-grey at the tip; skin of the head and neck deep pink-red, thinly sprinkled with short hair-like blackish-brown feathers; wattle bright yellow, tinged with red where it unites with the red of the neck; bill black; irides and feet brown.

The female is about a fourth less than the male in size, but so closely the same in colour as to render a separate description unnecessary. She also possesses the wattle, but not to so great an extent. (Gould.)

Size about that of a turkey.

Mr. Gould describes *Talegalla Lathami*, or the *Wattled Talegalla*, as a gregarious bird, generally moving about in small companies, much after the manner of the *Gallinaceæ*, and, like some species of that tribe, as very shy and distrustful. When it is disturbed, he states that it readily eludes pursuit by the facility with which it runs through the tangled brush. If hard pressed, or where rushed upon by their great enemy, the native dog, the whole company spring upon the lowermost bough of some neighbouring tree, and, by a succession of leaps from branch to branch, ascend to the top, and either perch there or fly off to another part of the brush. They resort also to the branches of trees as a shelter from the sun in the middle of the day, a habit which Mr. Gould notices as greatly tending to their destruction; for the sportsman is enabled to take a sure aim, and the birds, like the ruffed grouse of America, will allow a succession of shots to be fired till they are all brought down.

But the most remarkable circumstance connected with the economy of this bird is its nidification, for it does not hatch its eggs by incubation. It collects together a great heap of decaying vegetables as the place of deposit of its eggs, thus making a hot-bed, arising from the decomposition of the collected matter, by the heat of which the young are hatched. Mr Gould describes this heap as the result of several weeks' collection by the birds previous to the period of laying, as varying in quantity from two to four cart-loads, and as of a perfectly pyramidical form. This mound, he states, is not the work of a single pair of birds, but is the result of the united labour of many: the same site appeared to Mr. Gould to be resorted to for several years in succession, from the great size and entire decomposition of the lower part, the birds adding a fresh supply of materials on each occasion previous to laying.

"The mode," says Mr. Gould in continuation, "in which the materials composing these mounds are accumulated is equally singular, the bird never using its bill, but always grasping a quantity in its foot, throwing it backwards to one common centre, and thus clearing the surface of the ground for a considerable distance so completely, that scarcely a leaf or a blade of grass is left. The heap being accumulated, and time allowed for a sufficient heat to be engendered, the eggs are deposited, not side by side, as is ordinarily the case, but planted at the distance of nine or twelve inches from each other, and buried at nearly an arm's depth, perfectly upright, with the large end upwards: they are covered up as they are laid, and allowed to remain until hatched. I have been credibly informed, both by natives and settlers living near their haunts, that it is not an unusual event to obtain nearly a bushel of eggs at one time from a single heap; and as they are delicious eating, they are eagerly sought after.

Some of the natives state that the females are constantly in the neighbourhood of the heap about the time the young are likely to be hatched, and frequently uncover and cover them up again, apparently for the purpose of assisting those that may have appeared; while others have informed me that the eggs are merely deposited, and the young allowed to force their way unassisted. In all probability, as nature has adopted this mode of reproduction, she has also furnished the tender birds with the power of sustaining themselves from the earliest period; and the great size of the egg would equally lead to this conclusion, since in so large a space it is reasonable to suppose that the bird would be much more developed than is usually found in eggs of smaller dimensions. In further confirmation of this point, I may add, that in searching for eggs in one of the mounds, I discovered the remains of a young bird, apparently just excluded from the shell, and which was clothed with feathers, not with down, as is usually the case: it is to be hoped that those who are resident in Australia, in situations favourable for investigating the subject, will direct their attention to the further elucidation of these interesting points. The upright position of the eggs tends to strengthen the opinion that they are never disturbed after being deposited, as it is well known that the eggs of birds which are placed horizontally are frequently turned during incubation. Although, unfortunately, I was almost too late for the breeding-season, I nevertheless saw several of the heaps, both in the interior and at Illawarra: in every instance they were placed in the most retired and shady glens, and on the slope of a hill, the part above the nest being scratched clean, while all below remained untouched, as if the birds had found it more easy to convey the materials down than to throw them up. In one instance only was I fortunate enough to find a perfect egg, although the shells of many from which the young had been excluded were placed in the manner I have described. At Illawarra they were rather deposited in the light vegetable mould than among the leaves, which formed a considerable heap above them. The eggs are perfectly white, of a long, oval form, three inches and three-quarters long by two inches and a half in diameter." (*Birds of Australia.*)

The same author relates that these birds, while stalking about the wood, frequently utter a loud clucking noise; and, in various parts of the bush, he observed depressions in the earth, which the natives informed him were made by the birds in dusting themselves. The stomach is stated by Mr. Gould to be extremely muscular; and he found the crop of one which he dissected filled with seeds, berries, and a few insects.

Mr. Gould states that the extent of the range of this species over Australia is not yet satisfactorily ascertained. It is known, he says, to inhabit various parts of New South Wales from Cape Howe on the south to Moreton Bay on the north; but the cedar-cutters and others, who so frequently hunt through the brushes of Illawarra and Maitland, have nearly extirpated it from those localities, and it is now most plentiful in the dense and little-trodden brushes of the Manning and Clarence. Mr. Gould was at first led to believe that the country between the mountain-ranges and the coast constituted its sole habitat; but he was agreeably surprised to find it inhabiting the scrubby gullies and sides of the lower hills that branch off from the great range into the interior. He procured specimens on the Brezi range to the north of Liverpool Plains, and ascertained that it was abundant in all the hills on either side of the Namoi. (*Ibid.*)

In the *Leipoa* the bill is nearly as long as the head, slender, tumescent at the base, the edges undulated and incurved at the base, the nostrils ample, oblong,

Leipoa Ocellata. (Gould.)

covered with an operculum, and placed in a central hollow. Head subcrested. Wings ample, rounded, concave; fifth primary quill the longest; the tertiaries nearly as long as the primaries. Tail rounded, tail-feathers fourteen. Tarsi moderate, robust, covered with scuta anteriorly, and posteriorly with scales which are rounded and unequal. Toes rather short; lateral toes nearly equal. (Gould.) Head and crest blackish-brown; neck and shoulders dark ash-grey; the fore-part of the neck from the chin to the breast marked by a series of lanceolate feathers, which are black with a white stripe down the centre; back and wings conspicuously marked with three distinct bands of greyish white, brown and black near the tip of each feather, the marks assuming an ocellated form, particularly on the tips of the secondaries; primaries brown, their outer webs marked with two or three zigzag lines near their tip; all the under surface light buff, the tips of the flank feathers barred with black; tail blackish-brown, broadly tipped with buff; bill black; feet blackish-brown. (Gould.)

In size this beautiful bird is inferior to *Talegalla Lathami*, and it is more slender and more elegantly formed.

Mr. Gould, in his 'Birds of Australia,' gives an account collected by Mr. John Gilbert, from G. Moore, Esq., advocate-general, Mr. Armstrong, the aboriginal interpreter, and some of the more intelligent natives of Western Australia. The *Ocellated Leipoa* is there described as a ground-bird, never taking to a tree except when closely hunted: when hard pursued it will frequently run its head into a bush, and is then easily taken. Food generally consisting of seeds and berries. The note mournful, very like that of a pigeon, but with a more inward tone. Eggs deposited in a mound of sand, the formation of which is the work of both sexes. According to the natives, the birds scratch up the sand for many yards around, forming a mound about three feet in height, the inside of which is constructed of alternate layers of dried leaves, grasses, &c., among which twelve eggs and upwards are deposited, and are covered up by the birds as they are laid; or, as the natives express it, "the countenances of the eggs are never visible." Upon these eggs the bird never sits, but when she has laid out her lay, as the henwives say, the whole are covered up, when the mound of sand resembles an ant's nest. The eggs, which are white, very slightly tinged with red, and about the size of a common fowl's egg, are hatched by the heat of the sun's rays, the vegetable lining retaining sufficient warmth during the night. they are deposited in layers, no two eggs being suffered to lie without a division. The natives, who are

very fond of the eggs, rob these hillocks two or three times in a season; and they judge of the number of eggs in a mound by the quantity of feathers lying about. If the feathers be abundant, the hillock is full; and then they immediately open and take the whole. The bird will then begin to lay again, again to be robbed, and will frequently lay a third time. Upon questioning one of the men attached to Mr. Moore's expedition, he gave to Mr. Gilbert a similar account of its habits and mode of incubating; adding, that in all the mounds they opened they found ants almost as numerous as in an ant-hill; and that in many instances that part of the mound surrounding the lower portion of the eggs had become so hard, that they were obliged to chip round them with a chisel to get the eggs out: the insides of the mounds were always hot.

Captain Grey, of the 83rd regiment, who had just returned from his expedition to the north-west coast, informed Mr. Gould that he had never fallen in with the nests but in one description of country, viz. where the soil was dry and sandy, and so thickly wooded with a species of dwarf *Leptospermum*, that if the traveller strays from the native paths, it is almost impossible for him to force his way through. In these close scrubby woods small open glades occasionally occur, and there the Ngow-oo constructs its nest,—a large heap of sand, dead grass and boughs, at least nine feet in diameter and three feet in height; Captain Grey had seen them even larger than this. Upon one occasion only he saw eggs in these nests: they were placed some distance from each other, and buried in the earth. Captain Grey states that he is not sure of the number, but the account given by the natives led him to believe that at times large numbers were found.

This bird is found in Western Australia. Mr. Moore saw a great many of them about sixty miles north of Perth; but its most favourite country appears to be the barren sandy plains of the interior, one hundred miles north and east of York. The farthest point north at which Captain Grey saw the breeding-places was Gantheaume Bay. Captain Grey states that the natives of King George's Sound say that the same or a nearly allied species exists in that neighbourhood. (*Birds of Australia.*)

[To be continued.]

## RECENT IMPROVEMENTS IN LIGHT-HOUSES.

[Concluded from page 287.]

AMONG the lighthouses and sea-beacons projected and partially executed within the last few years, those for the Goodwin Sands deserve attention from the novel features which they present.

It may not be amiss to point out the locality and the nature of the Goodwin Sands, as a means of showing the importance of sea-lights in that quarter. Nearly opposite Deal is the commodious roadstead or anchorage called the "Downs," where ships are accustomed to assemble before proceeding on a voyage. It is about eight miles in length and six in width, and separates the mainland from the "Goodwin Sands," a dangerous shoal ten miles in length by two in breadth. The sands become partially uncovered at low-water; the material is soft, porous, and tenacious; they become hard and firm when the water is off, but the moment the tide begins to cover them they are again soft, and shift to and fro with the waves, occasioning a redness of the water which is plainly discernible from the town of Deal and the neighbouring shore. Such indeed is the shifting and loose state of the sands when slightly covered with water, that it has been asserted if a ship of the largest size were to strike on the Goodwin, it would be so wholly swallowed up by the quicksands, that in a few days no vestige of it would remain to be seen. Many millions of property have been lost on these sands, and probably thousands of lives. These calamities induced the corporation of the Trinity House in the latter part of the last century to direct their attention to the practicability of erecting a lighthouse on the sands. With this view they sent several experienced engineers to investigate the matter, but the report was unfavourable and the plan abandoned. A floating-light or light-ship was the only safeguard practically adopted.

Within the last two or three years, however, two plans have been suggested and partially acted on, viz., the safety-beacon of Captain Bullock, and the fixed lighthouse of Mr. Bush. The beacon was finished during the year 1840, and consists of a column about forty feet above the level of the sea, surmounted by a flag-staff ten feet high. There is a gallery large enough to hold forty persons round the top of the column, made of sail-cloth, access to which is obtained by ropes and 'cleats' or notches in the side of the column. A barrel of fresh water, together with a painted bag enclosing a flag of distress, is stationed on the gallery; and the words "Hoist the flag," painted in a great number of languages, on boards placed round the inner part of the gallery; so that the foreigner, as well as the native seaman, may be enabled to show a signal of distress, and obtain help from the shore, which is about seven miles distant from the beacon. The mode in which the beacon is fixed on such a treacherous foundation is the following:—A stout oak platform is laid several feet below the surface of the sand, and there secured by upwards of three tons of iron ballast. In the centre of this the stout vertical column is erected, and supported by eight oblique bars of iron, which are farther secured by chains passing in different directions. On the 21st of October, 1840, the Trinity House issued a notice in which they state—"A beacon has been experimentally placed on the south-eastern part of the Goodwin Sands, with the object of affording means of safety to persons who may unfortunately suffer shipwreck upon parts of these dangerous sands, from which this beacon is accessible at low-water; and mariners are hereby cautioned, that being situate a considerable distance within the south-eastern edge of the sand, this beacon is not on any account to be regarded as a beacon of direction. The shaft or mast is a spar of twelve inches diameter, fitted with a top-mast, on which a blue flag is to be hoisted when assistance is required, for which directions are given in eight different languages. The topmast is kept struck, to give the beacon the appearance of a wreck, and will give warning to those unacquainted with its position and character. The gallery is an octagon, of nine feet diameter, is five feet from the top of the mast, and is capable of containing at least forty persons: it is seventeen feet six inches above high-water spring-tides, and thirty feet from the dry sand."

After the erection of Captain Bullock's beacon, Lieutenant Worthington proposed an extension of the idea. His plan was to have an equilateral triangular frame, fastened by a vertical post in the centre. At the bottom of this central upright, and of each of the three posts which form the triangle, were to be large masses of cast-iron, upon which the superstructure was to be afterwards built. The iron masses were to be sunk in the sand, to the depth of a stratum possessing more firmness than that which occupies the surface. It was proposed to be forty feet in height. The triangular form is calculated to give great stability, as presenting the least amount of resistance to wind and sea. No large masses of timber were to be used; and the angles of the structure were to be so placed as to be opposite the most open and exposed parts of the

horizon. In connection with the platform at the top might, it was conceived, be provided a light, a boat, a gun, a bell, a flag-staff, and other requisites for distressed seamen who might be shipwrecked on the Goodwin Sands. Nothing, as far as we are aware, has been done in furtherance of this plan by Lieutenant Worthington.

In addition to Captain Bullock's beacon on the Godwin, which, it will be understood, is only a place of *refuge*, plans are in progress for building a permanent lighthouse on the sands. In the year 1836 Mr. Bush, civil engineer, submitted to a committee of the House of Commons on shipwrecks, a very singular plan, of which the following is an outline:—He proposed to build, on land, a wooden truncated cone, one hundred feet high, sixty feet diameter at the bottom, and twenty feet at the top. Around this was to be built another, touching it at the lower extremity, but receding from it upwards; and this intervening space was to be filled with sand or other materials to such a degree as to cause the whole to sink into the sea. It was to be sunk to such a depth as to have the top level with the highest water-mark; the sand was then to be drawn out from the inner cone, and its place supplied with masonry or concrete. This was to form a solid foundation, whereon was to be erected a cast-iron lighthouse one hundred feet high; so that the whole structure would be two hundred feet from the base of the cone to the top of the lantern. When thus far completed, the outer cone, which was only intended to facilitate the adjustment of the inner one, was to be removed. The cone, when filled in with granite, was estimated as likely to weigh about nine thousand tons.

Such was the plan submitted to the Trinity House, and to the committee of the House of Commons, about six years ago. Since then it has begun to be adopted in an altered form. The journals during the past year have contained many notices of Mr. Bush's present project, which may be shortly described as follows:—At the Thorncliffe iron-works, near Rotherham, in Yorkshire, has been cast an immense cylindrical caisson, or hollow case, sixty-four feet in height and thirty in diameter. This is to be sunk in the sands, and on it, as a base, erected a lighthouse, consisting of a column eighty-six feet in height, and a light-room and surmounting statue rising forty feet more. The weight of the lower shaft alone is estimated at a hundred and twenty tons. In the main shaft or column there is to be a cell large enough to hold one hundred men, with provisions, storehouses, magazines, &c. The caisson or lower shaft was to have been floated out to the sands, preparatory to being sunk, last autumn; but circumstances occurred which rendered a postponement necessary till the present year. We believe that the sinking of the caisson has not yet actually taken place.

The details given in the last paper, coupled with those here presented, will show that two totally different plans are now in agitation for the erection of lighthouses on a loose sandy foundation; the one being the insertion of screw-piles into the sand, as a foundation for a superstructure, and the other being the sinking of a heavy hollow case as a foundation. The experience of future years must show which of these methods possesses the larger share of advantages; the least expensive will in all probability be the screw-pile method.

Not the least curious among the lighthouse operations exhibited within the last two or three years, is the *absolute removal* of an entire lighthouse from one spot to another, without the disrupture or injury of any of its parts.*

* This fact was alluded to in our recent pages on the 'American Method of moving Houses.'

In the year 1803 a lighthouse was built by the late Mr. Pickernell on the northern pier at Sunderland. It is wholly composed of stone: its form is octagonal, fifteen feet in breadth across its base, nine feet across at the top, and about eighty feet high to the summit. During the month of May last year, a plan was under the consideration of the commissioners of the river Wear to pull down this lighthouse, and to re-erect it on the eastern extremity of the pier, a spot distant five hundred feet from the former locality. Mr. Murray, however, a civil engineer, conceived the practicability of removing the entire lighthouse this distance without destroying or endangering it. He submitted the following plan:—"The masonry was to be cut through near its foundation, and whole timbers were to be inserted, one after another, through the building, and extending seven feet beyond it. Above and at right angles to them, another tier of timber was to be inserted in like manner, so as to make the cradle or base a square of twenty feet; which cradle was to be supported upon bearers, with about two hundred and fifty wheels of six inches diameter, and was to traverse on six lines of railway, to be laid on the new pier for that purpose. The shaft of the lighthouse was to be tied together with bands, and its eight sides supported with timber braces from the cradle upwards to the cornice. The cradle was to be drawn and pushed forward by powerful screws along the railway, on the principle of Morton's patent slip for repairing vessels." This was the plan proposed, and was acted on throughout, with the exception of a windlass and rope, worked by thirty men, being substituted for screws. By making openings transversely through the masonry near the bottom, and by inserting stout timbers through them, the structure acquired by degrees an artificial bottom formed of timber; and this timber flooring being moved along a railway by means of wheels, was the means of transporting the bulky burden to its new locality. It is said that there was not a crack, nor any appearance of settlement, throughout the whole building after the removal.

A suggestion was made about two years ago by Captain Basil Hall, in a letter addressed to the 'United Service Journal,' which may hereafter be of importance in reference to the management of the lights in lighthouses. In order to render his meaning clear, he drew attention to the varieties observed in lighthouses, according to the precise purpose of each. If a lighthouse were required to be viewed from one point only, a fixed bright light visible in that direction would be all that was necessary; but it will often happen that circumstances require the light to be seen from every point of the horizon. Thus the Eddystone, the Scilly, the Bell Rock, and many other lighthouses must be rendered equally visible from whatever quarter they may be viewed; for if any point be left out, a ship sailing in that direction would be left without a guide. In the case first mentioned the matter is of little difficulty, for if one or more Argand lamps be placed in the foci of parabolic reflectors, adjusted so that their axes may be turned in the required direction, a steady light, of more or less magnitude, becomes visible in that quarter. But in the second case the difficulty is much greater, for as many lamps, aided by as many reflectors, are required as the points of the compass to be illuminated. Even this does not remove the evil, for the effect of a parabolic reflector is to send out the rays of light in one direction only; so that if we had twenty-four lamps in a circle, although they would light twenty-four different parts of the horizon, yet there would be twenty-four dark portions alternating with those which are illuminated.

This difficulty, as well as the dimness of the light when the lamps were so scattered, has led to the plan

of *revolving* lights. Captain Hall supposes as an illustrative instance, that we have twenty-four lamps in the lighthouse, ranged not equidistant round every point of the horizon, but six directed by means of their reflectors due north, six more due south, six east, and six west; thereby presenting a brilliant flood of light in those four directions. He then proceeds:—"If that part of the lighthouse upon which the four sets of lamps are fixed be so contrived as to turn round on a vertical axis, the four concentrated blazes of light cast from the different sets of lamps, instead of illuminating only the four cardinal points of the compass, will now light up, *in succession*, every part of the whole circuit of the horizon. Of course every ship, however situated with respect to the lighthouse, will in her turn be favoured with a brilliant though transient blaze of light, six times greater in splendour than she could have received from the fixed light first described."

Such a light as the one here described is called a "revolving" light, of which there are about twenty-five among the two hundred lighthouses on and around the British Islands. Captain Hall then explains why these improved lights are not more frequently employed; because it is necessary that two lights, comparatively near each other, should be of different character, in order that mariners may not confound one with the other at night. This difficulty is exemplified by alluding to the dangers which may accrue if the lighthouses at Scilly and at the Land's End both had revolving lights: as it is, the former of these is revolving, and the latter fixed; and although the latter is much inferior to the former, yet it is better than another revolving light would be at that spot, on account of the liability of mistakes in such a case. Captain Hall's suggestion is, that a fixed light, or rather a single light, should be made to rotate on its axis with such rapidity as to exhibit a line of light all along its path; on the principle of a burning stick whirled rapidly round in a circle. If this could be accomplished, the resulting light would be contiguous in every direction, and not intermitting, as a "revolving" light of the usual kind necessarily must be. Captain Hall does not enter into the mechanical difficulties of the matter, but throws out the suggestion for the consideration of engineers generally; expressing a conviction that "if the principle involved in the first inquiry (*i. e.* the production of a continuous horizontal circle of light by rapid revolution) were once established to be true, the ingenuity of practical men, and the important advantages arising from the discovery, would readily devise mechanical means of carrying it into effect."

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*Grecian Agriculture.*—I have before mentioned that the agricultural implements of the Greeks are exceedingly defective. The plough is the same as that described by Hesiod three thousand years ago; a simple piece of crooked timber, with only one shaft, and the ploughshare made of hard wood, sometimes tipped with iron. The harrow, the roller, the tormentor, the thrashing and winnowing machines, are perfectly unknown in Greece. The thrashing-floors, which generally belong to the commune, are circular pavements of about twenty yards in diameter, with a stake in the centre, and usually in an elevated position, to catch the wind, which is the Grecian winnowing-fan. To this stake are tied half-a-dozen horses, oxen, mules, and asses indiscriminately, and harnessed abreast, or rather tied together by a rope round the neck. The corn being strewed all over the floor, the cattle are placed at the outer circumference, and driven round and round, their circle becoming smaller and smaller every time, by the rope coiling itself round the post, till they necessarily come to a halt in the centre. They are then turned round, each circuit then extending by the cord unwinding, till they again reach the edge of the pavement. In this manner the corn is "trodden out;" and it may be remarked that the Greeks rigidly observe to the letter the Scriptural injunction, "Thou shalt not muzzle the ox that treadeth out the corn."—*Strong's Greece.*

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*The City of Hayti.*—Instead of a handsome city, such as it appears from the ship's deck at sea, rising on a gradual elevation from the shore, and adorned with good houses and gardens, you enter into streets of wooden buildings, with the pavement dislocated or broken up, the drains neglected, and filth and stable dung interrupting your steps in every direction. The quay is spacious, but the water is shallow near the shore; and all sorts of uncleanness are suffered to annoy the senses. A constant malaria is the consequence, which at certain seasons of the year renders the lower quarter of the city very sickly, and occasions much mortality among the sailors from foreign parts. Port-au-Prince, with all its advantages of situation, with every inherent capability of being made and kept delightfully clean, is perhaps the filthiest capital in the world. The houses in general are of two stories, built slightly of wood, to avoid the rend and tear occasioned by earthquakes, which at different times have nearly demolished the city. Some few of the better habitations are of brick or stone, and may be called handsome edifices. The Senate-house is a plain substantial building, with no pretension to splendour; and the palace of the President, the largest edifice in the city, was built by the English, for the general's head-quarters, during their temporary occupation of the south of the island; and is, therefore, as little like a royal palace as any republican could desire. The Haytien flag, of red and blue, floats on its turrets; and it has in front a spacious court, in which are lodges for the military guard of horse and foot, who are constantly on duty. These are the only public buildings worthy of notice. The Roman Catholic church is a capacious structure, but very plain and homely.—*Brief Notices of Hayti, by John Candler.*

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*To preserve Flowers fresh.*—It is now, alas! a long eighteen years ago since we first saw, in the drawing-room of a gentleman now no more, in the hot, dry weather of the dog-days, flowers preserved day after day in all their freshness by the following simple contrivance:—A flat dish of porcelain had water poured into it. In the water a vase of flowers was set; over the whole a bell-glass was placed with its rim in the water. This was a 'Ward's case' in principle, although different in its construction. The air that surrounded the flowers, being confined beneath the bell-glass, was constantly moist with the water that rose into it in the form of vapour. As fast as the water was condensed it ran down the sides of the bell-glass back into the dish; and, if means had been taken to enclose the water on the outside of the bell-glass, so as to prevent its evaporating into the air of the sitting-room, the atmosphere around the flowers would have remained continually damp. What is the explanation of this? Do the flowers feed on the viewless vapour that surrounds them? Perhaps they do; but the great cause of their preserving their freshness is to be sought in another fact. When flowers are brought into a sitting-room they fade, because of the dryness of the air. The air of a sitting-room is usually something drier than that of the garden, and always much more so than that of a good green-house or stove. Flowers when gathered are cut off from the supply of moisture collected for them by their roots, and their mutilated stems are far from having so great a power of sucking up fluids as the roots have. If, then, with diminished powers of feeding they are exposed to augmented perspiration, as is the case in a dry sitting-room, it is evident that the balance of gain on the one hand by the roots, and of loss on the other hand by their whole surface, cannot be maintained. The result can only be their destruction. Now, to place them in a damp atmosphere is to restore this balance; because, if their power of sucking by their wounded ends is diminished, so is their power of perspiring; for a damp atmosphere will rob them of no water. Hence they maintain their freshness. The only difference between plants in a 'Ward's case' and flowers in the little apparatus just described is this—that the former is intended for plants to grow in for a considerable space of time, while the latter is merely for their preservation for a few days; and that the air which surrounds the flowers is always charged with the same quantity of vapour, but will vary with the circumstances, and at the will of him who has the management of it. We recommend those who love to see plenty of fresh flowers in their sitting-rooms in dry weather to procure it. The experiment can be tried by inserting a tumbler over a rosebud in a saucer of water.—*Gardeners' Chronicle.*